tailed specific descriptions are attempted, the work is rendered more useful than a mere list would be, by the introduction of keys, by means of which all the Indian species can be discriminated. There are also some critical remarks upon disputed questions of specific distinction, which the large series of specimens at the author's disposal has enabled him to throw light upon, such as the identity of *Ovis poli* of the Pamir and the so-called *Ovis karelini* of the Thian Shan. Under the heading *Elephas indicus*, we note that Mr. Sclater refers to Schlegel's having pointed out in a well-known memoir (of which a translation appeared in the *Natural History Review*, vol. ii., 1862) certain distinctions between the true Indian elephant and that inhabiting the islands of Ceylon and Sumatra (*Elephas sumatranus*, Schlegel), and he repeats the characters assigned to the two supposed species or varieties. Although no fresh evidence is brought forward in favour of Schlegel's views, it is not likely that Mr. Sclater would, without good reasons, reject Dr. Falconer's elaborate refutation of them, published in the succeeding volume of the same Review. Dr. Falconer was such a great authority on elephants, and his arguments for the specific unity of the Asiatic forms have been so generally held to be sound, that Schlegel's two species can only be rehabilitated by a careful comparison of a considerable series of specimens undoubtedly natives of both localities. Perhaps Mr. Sclater may have an opportunity of doing this while in the East, and thus definitely settle a question of considerable zoological interest.

W. H. F.

A TEXT-BOOK OF CHEMICAL PHYSIOLOGY AND PATHOLOGY.

A Text-book of Chemical Physiology and Pathology. By W. D. Halliburton, M.D., B.Sc., M.R.C.P. (London: Longmans, Green, and Co., 1891.)

IN spite of the fact that several standard works on the subject of physiological chemistry exist, both in German and English, the need has nevertheless been universally felt of one that should at the same time present a review of the present condition of the subject from an impartial standpoint, and give some account of the methods of research employed.

Hoppe Seyle's works have been of immense service, but suffer from being onesided, and representing only the views and methods of the Strassburg school. The only work in English which promised to be universal in its scope—namely, that by Gamgee—is unfortunately still unfinished.

Prof. Halliburton, who is justly celebrated for his work in all departments of physiological chemistry, has attempted to fill this gap in our literature, and with a large measure of success.

The first fifty pages of the book are taken up with an account of the apparatus and analytical methods chiefly employed in physiological chemical research. The only fault we have to find with this part of the book is that there is not enough of it. In a book intended as a guide to those who would work practically at the subject one hundred and fifty pages might well be devoted to these subjects, seeing that so many workers boldly attack the chemical problems of physiology with scarcely any practical knowledge of chemical analytical methods.

The second part treats of the chemical constituents of the organism, concluding with two chapters on fermentation and ptomaines, the chapters on the latter and on proteids being especially good, and presenting an excellent *résumé* of our present knowledge of these subjects.

The next section is taken up with an account of the tissues and organs of the body. Here the author is thoroughly at home, and can speak with the authority of many years' practical work at the subject. It is rather difficult, however, to see on what principle he includes respiration in this part, especially as the subjects of alimentation, excretion, and general metabolism have each a part to themselves; unless it be, that it is so intimately connected with the physiology of the blood In this chapter a student might be led astray by seeing the table of relations between the tension of the gases in venous blood and of those in the alveolar air. The important thing to know is the tension of gases in arterial blood; and by giving those in venous blood in juxtaposition to those in the alveolar air, the author glosses over the difficulties presented by the question of gas interchange in the lungs. In this connection, too, he does not notice Bohr's important work on the subject (interchange of gases in the lungs), although he gives a full account of the Danish physiologist's researches on the combination of hæmoglobin with CO_2.

In the latter part of the book no reference is made to Altmann's views on fat absorption, or to Ehrlich's suggestive work on the oxidative processes taking place in living tissues.

But a few errors of omission are inevitable in a work of this size and scope, and Dr. Halliburton wins our admiration for the completeness and correctness of his book, which everywhere shows signs of the care with which the proof-sheets have been revised and brought up to date. The accounts of recent analytical methods and work render it invaluable in a physiological laboratory, and it will be repeatedly referred to by students who desire more than a superficial knowledge of the subject. In Germany it has already found favour with physiologists, and is considered the best work on the subject. The fact that it is being translated into German, under the auspices of Prof. Kühne, is of itself sufficient recommendation for any work; and there is no doubt that in its new dress it will command as much success in Germany as it has already commanded in England.

E. H. STARLING.

OUR BOOK SHELF.

Praktisches Taschenbuch der Photographie. By Dr. E. Vogel, Assistant in the Photochemical Laboratory of the Technical High School of Berlin. (Berlin: Robert Oppenheim, 1891.)

THIS is a small volume, of some 200 pages, but it is full of useful information for working photographers, whether amateurs or professionals. Under nine sections the author treats of all the subjects likely to be required by the manipulator of the camera, from the purchase of his apparatus onward through every detail essential for successful work. The value of the book is greatly enhanced by numerous illustrations, which are

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executed with that clearness and finish for which so many Continental scientific works are justly to be commended. To give an idea of its contents it will be sufficient to mention the headings of the sections, viz. apparatus for the negative process, photographic objectives, instantaneous shutters, portable cameras, equipment of the dark room, general remarks on exposure, negative processes, positive processes, cyanotype and similar processes. The work, as its title implies, is purely technical, and, as such, does not call for lengthened notice in these columns, but for the particular object with which it has been written it is admirably adapted, and should find many readers in this country. We have nothing which can be compared with it for conciseness and completeness.

An Introduction to the Differential and Integral Calculus. By T. Hugh Miller. (London: Percival and Co., 1891.)

THIS small book contains a fair amount of the calculus put together in a clear and readable form. It merely touches the subject, but appears to contain enough to meet the wants of a South Kensington examinee. "It assumes a knowledge of elementary algebra and trigonometry as far as the properties of plane triangles." The student is supposed to be unacquainted with analytical geometry, but as he is credited with a knowledge of the exponential and binomial theorems, with "indeterminate coefficients" and a few other matters, it will be seen that *elementary* includes a fair grasp of the two subjects named. Six chapters are devoted to the elements, successive differentiation, the theorems of Leibnitz, Taylor, and Maclaurin, maxima and minima values of a function of one variable, and the evaluation of indeterminate expressions; the remaining four chapters are devoted to elementary integration, formulæ of reduction, rational fractions, and a few applications of the integral calculus. We presume that the miscellaneous examples are taken from South Kensington papers; those in the text are old friends which figure in Todhunter's works. In the text. the following slips occur: p. 4, l. 15, for $f(x)$ read $f'(x)$; p. 18 (6), read e^{x^x}; p. 37 (3), for $\frac{x^6}{720}$ we get $\frac{x^6}{5}$; p. 40 (3), ? $(a-b)^2/a$ for the maximum; p. 41, l. 4 up, for $2a+3b$, read $3a+2b$; p. 42 (1), read $\cos^3\theta$ and $3\sqrt{3}d^2/16$; p. 62 (4), ? last connecting sign (read $-$); p. 71 (4), for π read π^2; p. 80 (24), in first place read $(1+x^2)^2$. In the answers, we differ from the author in (1), (20), (74), and (88). We prefer to work (84) from $\int(1+t^2)^{\frac{3}{2}}dt$, where t stands for $\tan x$.

Star Groups. By J. Ellard Gore. (London: Crosby Lockwood and Son, 1891.)

A KNOWLEDGE of the principal constellations visible in our latitudes may be easily acquired from the thirty maps and accompanying text contained in this work. All stars down to the sixth magnitude are shown, and brief descriptions given of the objects of interest in each constellation. The maps are intended to be useful as an introduction to larger atlases, and will doubtless serve this purpose well; but a beginner unacquainted with the motions of the heavenly bodies will hardly find in them what he requires. G.

The Universal Atlas. (London: Cassell and Company, 1891.)

THIS atlas is being issued in twenty-eight parts, including the index, eight of which have already appeared. It contains fifty-eight single page maps and thirty-two double page, several illustrating physical geography. The maps are well drawn and reproduced, and full of detail, whilst their large scale has enabled the names of all places of any importance to be printed with perfect legibility. In fact, all who require a good atlas, for reference or otherwise, would do well to obtain this one. G.

La Transcaucasie et la Péninsule d'Apchéron. Calouste S. Gulbenkian. (Paris: Hachette et Cie., 1891.)

THIS is a very pleasant book of travels, well worthy of the attention of all who for any reason take interest in the Caucasus. The author has no very stirring adventures to tell us of, but he presents lucid and attractive descriptions of the towns and districts through which he passed, and of the manners and customs of the inhabitants. Especially good are the chapters he has devoted to the petroleum industry—chapters which have already appeared in the *Revue des Deux Mondes.* He gives also a very interesting account of Oriental carpets, the manufacture of which plays so great a part in the Caucasus.

How to Organize a Cruise on the Broads. By E. R. Suffling. (London: Jarrold and Sons, 1891.)

IN preparing this little book, the author did not attempt to provide a guide to the Broads. He intended the volume to serve merely as a supplement or appendix to the various guides already accessible. A cruise on the Broads is heartily enjoyed by everyone who tries it under tolerably favourable conditions, and certainly not least by students of natural history. Anyone who may think of making the experiment will find in Mr. Suffling's pages all the information that is really necessary for the formation of suitable plans. In one chapter he presents a brief and interesting diary of what may be looked for at the Broads during the various months of the year.

LETTERS TO THE EDITOR.

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A Difficulty in Weismannism.

I HAD intended to accept Prof. Hartog's challenge, and say a few words on this subject at an earlier date, but absence from home and many engagements have interfered until now.

In some respects it would have been more convenient to defer such a discussion until Weismann's last essay, "Amphimixis," has become more widely known, or even until the appearance of his complete and detailed work, which is expected some time next year. Prof. Weismann tells me that the points raised by Prof. Hartog are considered in this treatise, and, such being the case, he is unwilling to tax his already over-strained eyesight with any earlier reply.

As the question has been raised, I will briefly speak of the manner in which I have tried to see my way through such difficulties. I do not, however, wish to involve anyone else in the responsibility for the attempt, which is no doubt crude and insufficiently thought out.

Accepting Prof. Hartog's five theses as fair statements, I have always proceeded to make his hypothesis B, and in this I believe I am following Prof. Weismann. Hypothesis A had never occurred to me, and I agree with Prof. Hartog in considering it as valueless But I believe a way through the difficulties raised against hypothesis B may be found in the assumption of a relationship between the Ahnenplasmas in the germ-cell. Such a relationship is perhaps hinted at by Prof. Hartog in Thesis III., where he speaks of these units as lying "associated together," and in this respect the metaphor of two packs of cards in Thesis IV. is, I believe, inadequate. I have always been accustomed to regard the relationship between the ancestral units, the "pattern" or figure which they form, as an essential part of the process. I have regarded the units as the necessary material, like the pigments in a colour-box, while their arrange-

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